



ON Semiconductor®

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# LA6500

## Monolithic Linear IC Power Operational Amplifier

### Overview

The LA6500 is a power operational amplifier.

### Features

- High output current ( $I_O$  max = 1.0A)
- High gain
- With current limiter
- Capable of being operated from single supply

### Specifications

**Maximum Ratings** at  $T_a = 25^\circ\text{C}$

| Parameter                   | Symbol          | Conditions                    | Ratings     | Unit             |
|-----------------------------|-----------------|-------------------------------|-------------|------------------|
| Maximum supply voltage      | $V_{CC}/V_{EE}$ |                               | $\pm 18$    | V                |
| Differential input voltage  | $V_{ID}$        |                               | 30          | V                |
| Common-mode input voltage   | $V_{IN}$        |                               | $\pm 15$    | V                |
| Output current              | $I_O$ max       |                               | 1.0         | A                |
| Allowable power dissipation | $P_d$ max1      | With infinity large heat sink | 20          | W                |
|                             | $P_d$ max2      | Independent IC                | 1.75        | W                |
| Operating temperature       | $T_{opr}$       |                               | -20 to +75  | $^\circ\text{C}$ |
| Storage temperature         | $T_{stg}$       |                               | -55 to +150 | $^\circ\text{C}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# LA6500

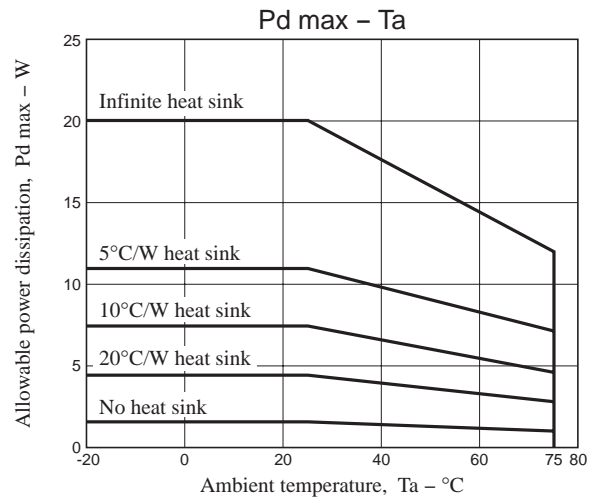
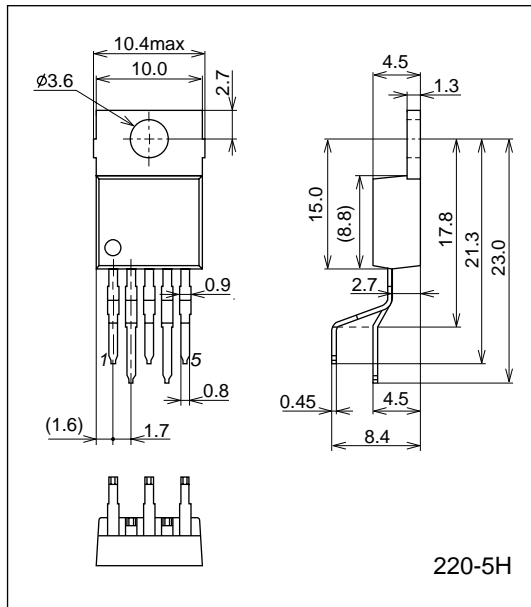
**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC}/V_{EE} = \pm 15\text{V}$

| Parameter                       | Symbol    | Conditions                                                   | Ratings  |          |      | Unit             |
|---------------------------------|-----------|--------------------------------------------------------------|----------|----------|------|------------------|
|                                 |           |                                                              | min      | typ      | max  |                  |
| Quiescent current dissipation   | $I_{CCO}$ |                                                              |          | 6.0      | 12.0 | mA               |
| Input offset voltage            | $V_{IO}$  |                                                              |          | 2        | 6    | mV               |
| Input offset current            | $I_{IO}$  |                                                              |          | 10       | 200  | nA               |
| Input bias current              | $I_B$     |                                                              |          | 100      | 700  | nA               |
| Common-mode input voltage range | $V_{ICM}$ |                                                              | -15      |          | +13  | V                |
| Common-mode rejection           | CMR       |                                                              | 70       | 80       |      | dB               |
| Maximum output voltage          | $V_O$     | $R_L = 33\Omega$                                             | $\pm 12$ | $\pm 13$ |      | V                |
| Voltage gain                    | $V_{GO}$  |                                                              |          | 100      |      | dB               |
| Slew rate                       | SR        | $G_V = 0, R_L = 33\Omega, R = 2.2\Omega, L = 0.1\mu\text{F}$ |          | 0.15     |      | V/ $\mu\text{s}$ |
| Equivalent input noise voltage  | $V_{NI}$  | $R_g = 1\text{k}\Omega, \text{DIN AUDIO}$                    |          | 2        |      | $\mu\text{V}$    |
| Supply voltage rejection        | SVR       |                                                              |          | 30       | 150  | $\mu\text{V/V}$  |
| Limiting current                | $I_{SC}$  |                                                              |          | 1.0      |      | A                |

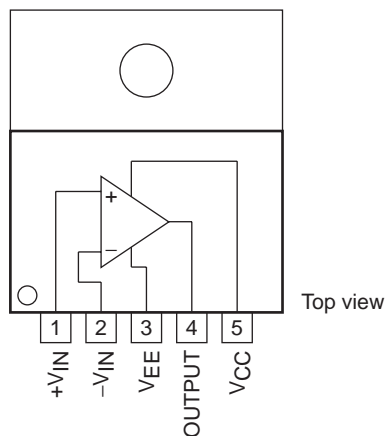
## Package Dimensions

unit : mm (typ)

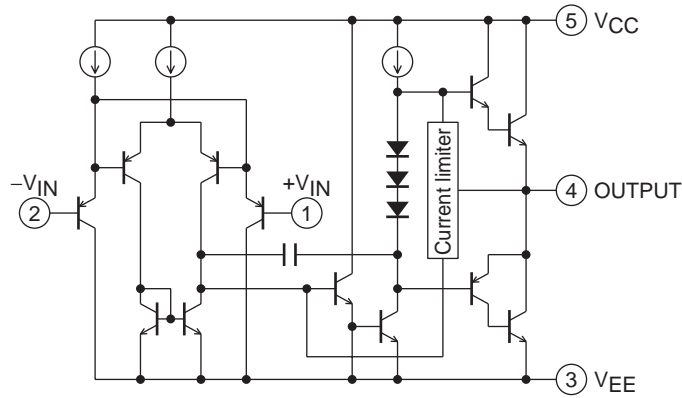
3079C



## Pin Assignment

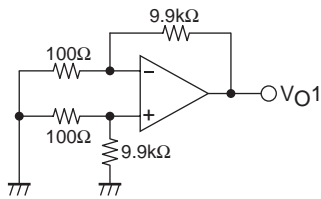


Equivalent Circuit



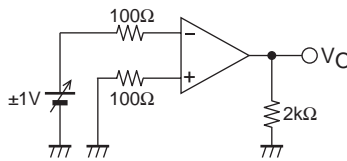
Test Circuit

(1)  $V_{IO}$ , SVRR



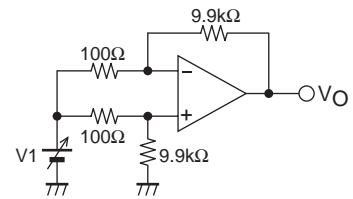
•  $V_{IO}$  is  $V_{CC}/V_{EE} = \pm 15V$   
 • SVRR is  $\begin{cases} V_{CC} = 15, 5V \\ V_{EE} = -5, -15V \end{cases}$

(2)  $V_O$



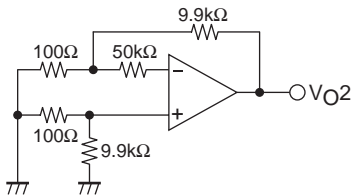
•  $V_{IO} = V_O / 100$   
 $SVR(+) = \frac{\Delta V_O}{100 \times 10V}$   
 $SVR(-) = \frac{\Delta V_O}{100 \times 10V}$

(3) CMMR,  $V_{ICM}$



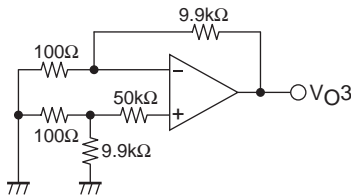
• CMRR  $V_1 = \pm 7.5V$   
 •  $CMR = 20 \log \frac{15 \times 100}{|\Delta V_O|}$

(3)  $I_B(+)$



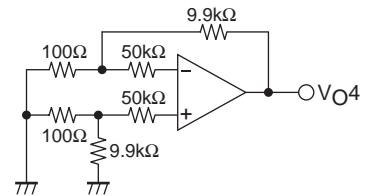
•  $I_B(+) = \frac{|V_{O2} - V_{O1}|}{50k\Omega \times 100}$

(4)  $I_B(-)$



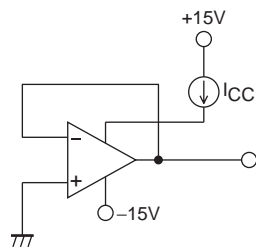
•  $I_B(-) = \frac{|V_{O3} - V_{O1}|}{50k\Omega \times 100}$

(5)  $I_{IO}$

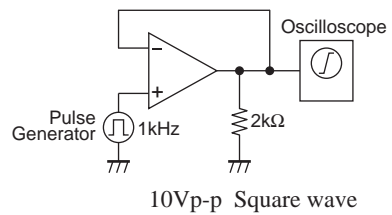


•  $I_{IO} = \frac{|V_{O4} - V_{O1}|}{50k\Omega \times 100}$

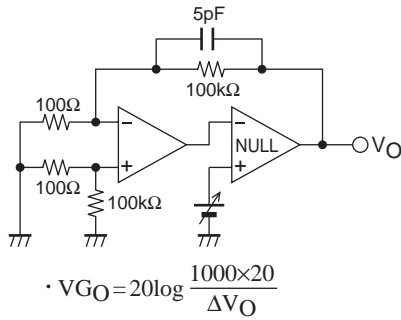
(7)  $I_{CC}$



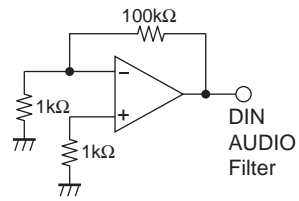
(8) SR



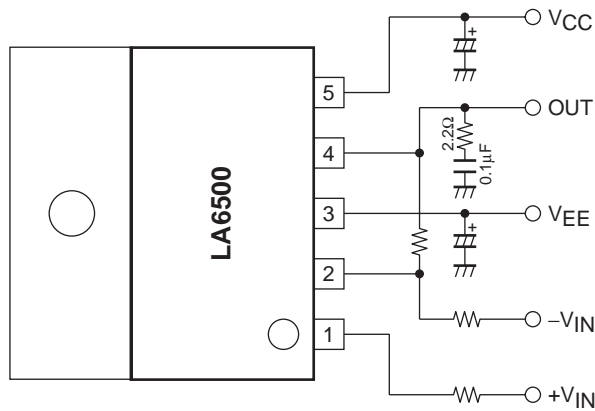
(9)  $V_{GO}$



(10)  $V_{NI}$





Application Circuit Example



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